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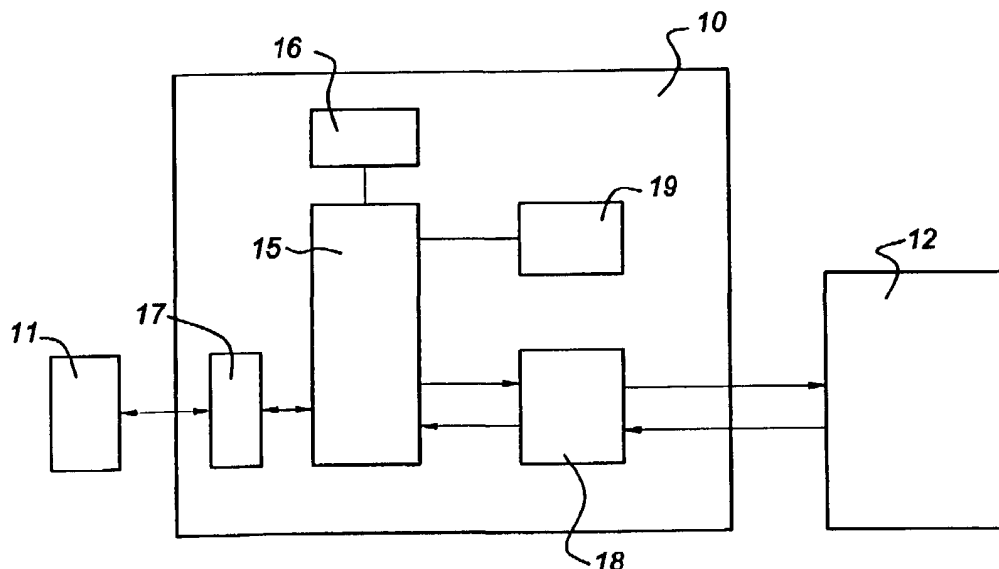
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(54) Title: METHOD AND SYSTEM FOR REVALUING PREPAID TELEPHONE ACCOUNTS



(57) Abstract: System (10) and method for revaluing a prepaid telephone account, the system (10) comprising first interface means (17) for communicating with a telephone user (11), first database means (16; 22) for storing user information, second database means (16; 23) for storing a plurality of valid revalue codes, and processing means (15). The processing means (15) are arranged for receiving a first code from a telephone user (11), and sending a revalue message to the telephone user (11) after checking that the first code matches with the user information. In a preferred embodiment, the system further comprises second interface means (18) for communicating with a telephone service provider system (12), the processing means (15) being further arranged for sending a revalue request to the telephone service provider system (12). After receiving an acknowledgement from the telephone service provider system (12), the revalue message comprising an acknowledgement is being sent.

Method and system for revaluing prepaid telephone accounts

The present invention relates to a method and a system for revaluing prepaid telephone accounts, such as used in mobile telephony.

5 At present, a user of a mobile prepaid telephone can revalue his telephone account by calling a predetermined number to contact the telephone service provider, usually by means of a computer server. First, the user will have to buy a calling card with a given value at a store (general store or a store dedicated to selling prepaid telephone cards). By inputting a code identified on the card previously purchased  
10 (usually by scratching off a degradable layer over a printed code and inputting the code on the telephone keypad), the telephone account of the user is revalued with the given value.

Usually, a user of a mobile telephone does not always buy calling cards in advance. Also, it may happen that in a certain period, a mobile telephone user utilises  
15 the mobile telephone more than planned, resulting a much quicker consumption of the prepaid account. At the moment that the prepaid account is very low or zero, the user can no longer make any telephone calls (except emergency calls). As the case may be, the user may also not be able to buy a new calling card at that time or at the user's present position.

20 The present invention seeks to provide a method and a system for enabling a mobile telephone user to augment his prepaid account anywhere and anytime he/she wants.

The present invention provides a method as defined above, comprising the steps of receiving a first code from a telephone user, receiving a telephone number associated  
25 with the telephone user (e.g. by using calling line identification CLI or direct input from the user), and sending a revalue message to the telephone user after checking that the first code matches with the telephone number. Preferably, the method comprises the further step of receiving the predetermined amount from the telephone user.

The telephone user may benefit from the present method by being able to revalue  
30 or augment his prepaid telephone account whenever he wants, without the need to buy separate calling cards at a local store and calling his mobile telephony service provider. An intermediate vendor of prepaid account credits does not have to keep a large number of calling cards in stock, only a (computer) file or database with registered

customers (combinations of telephone number and first codes) and account credit information (a plurality of valid revalue codes or any other representation of a period of time, such as a time slice or time package). Using the present method, the telephone service providers have the benefit that large amounts of prepaid telephone credits may  
5 be bought by the intermediate service provider, shifting the risk of distributing the prepaid telephone credits to the intermediate service provider.

The revalue message may be in the form of a voice message or in the form of a data message, such as an SMS message. When the user is utilising a mobile telephone, the option with data messages (more preferably SMS message) is preferred, as this  
10 option enables the user to simply save the information in the user's mobile telephone.

In a first embodiment of the present invention, the revalue message comprises a second code, the second code being one of a plurality of valid revalue codes. The valid revalue code may be a regular revalue code, but also any other representation of an amount of credit, such as a period of time, a time slice or a time package. This enables  
15 that the intermediate vendor only has to maintain a list of valid revalue codes (e.g. in a computer database or file) instead of a large stock of cards, which may e.g. be stolen or damaged. For the telephone user it is simple to augment his prepaid telephone account using the second code.

In a further embodiment of the present method, the method comprises the further  
20 steps of sending a revalue request to a telephone service provider after checking that the first code matches with the telephone number, the request comprising the predetermined amount, the telephone number and a second code, the second code being equal to one of a plurality of valid revalue codes, the revalue message being sent after receiving an acknowledgement from the telephone service provider that the prepaid  
25 telephone account has been revalued, the revalue message comprising an acknowledgement. In this embodiment, the user only has to contact the intermediate service provider and provide a first code (such a PIN code) to revalue the prepaid account. The intermediate service provider forwards a second code (which may be a regular revalue code, but also any other representation of an amount of credit, such as a  
30 period of time, a time slice or a time package) to the telephone service provider, without the telephone user being aware of it.

In a still further embodiment, the method comprises the further steps of,

between receiving the first code from the telephone user and sending the revalue message to the telephone user, sending a pre-recorded message to the telephone user. By using advertising, the intermediate service provider may lower the cost of the prepaid telephony accounts for the user or may introduce a customer fidelity program  
5 (bonus points or something like that), as the advertising generates income to the intermediate service provider.

A second aspect of the present invention relates to a system for revaluing a prepaid telephone account with a predetermined amount, the system comprising first interface means for communicating with a telephone user, first database means for  
10 storing user information, the user information comprising at least a first code and an associated telephone number, second database means for storing a plurality of second codes, and processing means, connected to the first interface means, first database means and second database means, the processing means being arranged for receiving a first code from a telephone user, receiving a telephone number associated with the  
15 telephone user (e.g. by using calling line identification CLI or direct input from the user), sending a revalue message to the telephone user after checking that the first code matches with the telephone number in the user information. The second code may be a regular revalue code, but also any other representation of an amount of credit, such as a period of time, a time slice or a time package.

20 An intermediate service provider may utilise such a system for providing a revalue possibility of prepaid accounts of telephone users. The telephone user may revalue a prepaid account whenever he wants, without the need to buy separate calling cards at a local store and calling his mobile telephony service provider. An intermediate service provider or vendor of prepaid account credits does not have to keep a large  
25 number of calling cards in stock, only a (computer) file or database with registered customers (combinations of telephone number and first codes) and second codes. The second code may be a regular revalue code, but also any other representation of an amount of credit, such as a period of time, a time slice or a time package.

Preferably, the processing means are further arranged for receiving the  
30 predetermined amount from the telephone user. This provides the system with flexibility with regard to the amount of revaluation the user wants.

More preferably, the first interface means comprise an interactive voice response system for receiving input from the telephone user and sending voice messages to the

telephone user. Interactive voice response systems are well known in the art, and provide the functionality and flexibility to the system allowing use from anywhere and anytime.

In a first embodiment of the present system, the processing means are further  
5 arranged for sending a revalue message, the revalue message comprising a second code being one of a plurality of valid revalue codes. The valid revalue code may be a regular revalue code, but also any other representation of an amount of credit, such as a period of time, a time slice or a time package. After receiving the valid revalue code, the telephone user may revalue the prepaid account in the usual way, e.g. by calling a  
10 dedicated telephone number of the telephone service provider.

In a further embodiment of the present system, the system further comprises second interface means connected to the processing means for communicating with a telephone service provider system, the processing means being further arranged for sending a revalue request to the telephone service provider system after checking that  
15 the first code matches with the telephone number, the request comprising the telephone number and a second code, the second code being equal to one of a plurality of valid revalue codes, and the revalue message comprising an acknowledgement, the revalue message being sent after receiving an acknowledgement from the telephone service provider that the prepaid telephone account has been revalued. This embodiment allows  
20 a user to automatically revalue the prepaid account, without the need to perform any further actions.

Preferably, the second interface means are arranged to communicate with an interactive voice response system of the telephone service provider system. Using this arrangement, the present system may interface with existing revalue systems of  
25 telephone service providers.

Also, the present system may further comprise third database means for storing settings for the second interface for communication with telephone service provider system. Depending on which telephone service provider is associated with a specific telephone number, the settings for communication with the telephone service provider  
30 may be adapted.

A still further aspect of the present invention relates to a computer program product, comprising computer executable code, which when run on a computer provides the steps of the method according to the present invention. This computer

program product may be loaded in a computer server of an intermediate service provider for implementing the method according to the present invention.

The present invention will now be explained in more detail by discussion of a preferred embodiment of the present invention, by reference to the accompanying

5 drawings, in which:

Fig. 1 shows a schematic diagram of an embodiment of the system according to the present invention;

Fig. 2 shows a data flow diagram of an embodiment of the method according to the present invention.

10 The present invention is illustrated by means of a number of exemplary embodiments, directed at revaluing prepaid accounts for mobile telephony. However, it will be clear that the present invention can also be applied to other fields, such as normal telephony, or prepaid provision of other utilities, such as television, electricity, etc.

15 Fig. 1 shows a schematic diagram of a first embodiment of the revalue system 10 according to the present invention. The revalue system 10 is operated by an intermediate service provider, which provides for a revaluing service for registered customers, anytime they want and from any place. The revalue system 10 comprises a processor 15 (or other means for processing data) which is connected to memory means  
20 16, such as a disk drive or solid state memory (static RAM, dynamic RAM, etc.). Furthermore, the processor 15 is connected to a first interface 17, the first interface 17 being arranged to communicate with a telephone 11 of a user, such as a mobile GSM telephone. Also, the processor 15 is connected to a second interface 18, for communicating with a telephone service provider computer 12. Optionally, the  
25 processor 15 may be connected to a message storage system 19, such as a tape recorder or a hard disk recorder, on which voice messages, such as commercials, are stored.

Preferably, the first interface 17 is arranged as an interactive voice response system. A user of a mobile telephone 11 can easily connect with the interactive voice response system 17, e.g. by calling a predetermined telephone number (which may be a  
30 no charge 0800 number). The user may identify himself by inputting his telephone number, or the interactive voice response system 17 may obtain the telephone number by using calling line identification, a function usually provided in mobile or other public switched telephone networks.

Fig. 2 shows a data flow diagram of the method according to the present invention. Fig. 2 shows the mobile telephone user, indicated by reference numeral 11, who interfaces with a revalue process 20. The revalue process 20 interfaces with an accounting process of the telephone service provider 21. Also, the revalue process 20  
5 interfaces with a number of stores, i.e. a customer database 22, a database 23 with a plurality of valid codes for revaluing prepaid accounts, and a message database 24 comprising recorded voice messages. Preferably, the customer database 22 and the database 23 with valid codes are stored in the memory means 16, and the message database 24 is preferably stored on the message storage system 19. The revalue process  
10 20 is running on the processor 15, and the first and second interface 17, 18. The customer database 22 may comprise details about each customer (identified by an associated (mobile) telephone number) for billing purposes.

After receiving the telephone number of the mobile telephone 11 by the revalue process 20, the user 11 is prompted by the interactive voice response system 17 to input  
15 a first code, which is a verification code for establishing that he is a registered customer of the intermediate service provider. The revalue process 20 checks the telephone number received and the first code received from the user 11 in the customer database 22. Optionally, the user 11 can input a desired amount to revalue his prepaid account, but preferably, the amount of revaluation is a fixed predetermined amount.

20 After checking the first code and the telephone number, the revalue process starts with the actual revaluation of the prepaid account. In a first embodiment, the revalue process 20 looks up a second code, which is a valid revaluation code, in the database 23. After that, the revalue process 20 communicates the second code and the telephone number to a message process 21. This message process 21 may be run in the  
25 revaluation system 10 itself, or in a separate system, such as the service provider system 12. The message process 21 then sends a message to the mobile telephone user 11, either as a voice message or as a data message, such as an SMS message. After receiving the second code, the mobile telephone user 11 can revalue his prepaid account in the usual way at his telephone service provider using the second code.

30 In an alternative embodiment, the revalue process 20 sends a revalue request to the account process 21 which is executed at the telephone service provider system 12. The revalue request comprises the telephone number of the mobile telephone user 11 and the second code. The revalue request may also comprise the desired amount of



revaluation, if known. The account process 21 receives the request, and after checking the telephone number and the second code, updates the prepaid account associated with the specific telephone number. Then, the account process 21 sends an acknowledgement to the revalue process 20. After receiving the acknowledgement  
5 from the account process 21, the revalue process 20 notifies the mobile telephone user 11 that the prepaid account has been revaluated, either by a voice message (using the interactive voice response system) or by a data message.

When a prepaid account of a customer has been revalued by the revalue process 20, billing details are obtained from the customer database 22 in order to recoup the  
10 costs of the revaluation (e.g. by charging a (credit card) account).

In the time between the start of the revaluation (i.e. after receiving all inputs from the mobile telephone user 11) and the end of the revaluation, the revalue process 20 may download a (commercial) message from the message database 24, and send that message to the mobile telephone user 11. This may be implemented using the processor  
15 15, message storage system 19 and first interface 17 of the revalue system 10. This dissemination of commercial messages opens the possibility for the intermediate service provider to either lower the price of revaluing the prepaid accounts, or to introduce a customer fidelity bonus system with which a customer can collect bonus points.

20 In a preferred embodiment, the revalue system 10 can operate with a number of different telephone service provider systems 12, representing different providers. To accomplish this, the memory means 16 of the revalue system 10 comprise information concerning the required settings of the second interface 18 for proper communication with each of the possible telephone service provider systems 12. The required settings  
25 may comprise a telephone number of the telephone service provider system 12, and specific information concerning the format of data communication with the telephone service provider system 12 (which may e.g. also be an interactive voice response system). In operation, the revalue process 20 may deduce from the received telephone signal or received telephone number which telephone service provider system 12 it  
30 should interface with.

CLAIMS

1. Method for revaluing a prepaid telephone account with a predetermined amount, comprising the steps of:
  - 5 receiving a first code from a telephone user (11);
  - receiving a telephone number associated with the telephone user(11);
  - sending a revalue message to the telephone user (11) after checking that the first code matches with the telephone number.
- 10 2. Method according to one of the preceding claims, in which the method comprises the further step of receiving the predetermined amount from the telephone user (11).
3. Method according to claim 1 or 2, in which the revalue message is a voice
  - 15 message.
4. Method according to claim 1 or 2, in which the revalue message is a data message, such as an SMS message.
- 20 5. Method according to one of the claims 1 through 4, in which the revalue message comprises a second code, the second code being one of a plurality of valid revalue codes.
6. Method according to one of the claims 1 through 4, in which the method
  - 25 comprises the further steps of:  - sending a revalue request to a telephone service provider (12) after checking that the first code matches with the telephone number, the request comprising the predetermined amount, the telephone number and a second code, the second code being equal to one of a plurality of valid revalue codes;
  - 30 the revalue message being sent after receiving an acknowledgement from the telephone service provider (12) that the prepaid telephone account has been revalued, the revalue message comprising an acknowledgement.

7. Method according to one of the preceding claims, in which the method comprises the further steps of:  
between receiving the first code from the telephone user (11) and sending the revalue -  
message to the telephone user (11), sending a pre-recorded message to the telephone  
5 user (11).

8. System (10) for revaluing a prepaid telephone account with a predetermined amount, the system (10) comprising:  
first interface means (17) for communicating with a telephone user (11);  
10 first database means (16; 22) for storing user information, the user information comprising at least a first code and an associated telephone number;  
second database means (16; 23) for storing a plurality of second codes;  
processing means (15), connected to the first interface means (17), first database means (16; 22) and second database means (16; 23), the processing means (15) being arranged  
15 for  
receiving a first code from a telephone user (11);  
receiving a telephone number associated with the telephone user (11);  
sending a revalue message to the telephone user (11) after checking that the first code matches with the telephone number in the user information.

20

9. System according to claim 8, in which the processing means (15) are further arranged for receiving the predetermined amount from the telephone user (11).

10. System according to claim 8 or 9, in which the first interface means (17)  
25 comprise an interactive voice response system for receiving input from the telephone user (11) and sending voice messages to the telephone user (11).

11. System according to claim 8, 9 or 10, in which the processing means (15) are further arranged for sending a revalue message, the revalue message comprising a  
30 second code being one of a plurality of valid revalue codes.

12. System according to claim 8, 9 or 10, in which the system (10) further comprises second interface means (18) connected to the processing means (15) for communicating with a telephone service provider system (12), the processing means (15) being further arranged for
- 5 sending a revalue request to the telephone service provider system (12) after checking that the first code matches with the telephone number, the request comprising the telephone number and a second code, the second code being equal to one of a plurality of valid revalue codes; and
- the revalue message comprising an acknowledgement, the revalue message being sent
- 10 after receiving an acknowledgement from the telephone service provider system (12) that the prepaid telephone account has been revalued.

13. System according to claim 12, in which the second interface means (18) are arranged to communicate with an interactive voice response system of the telephone
- 15 service provider system (12).

14. System according to claim 12 or 13, in which the system (10) further comprises third database means (16) for storing settings of the second interface (18) for communication with telephone service provider system (12).

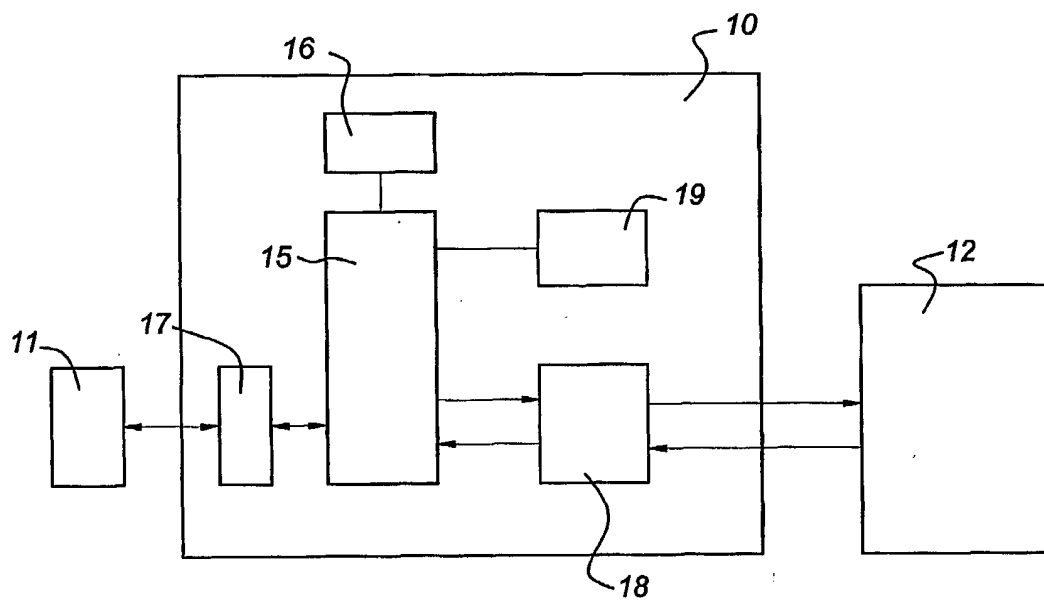
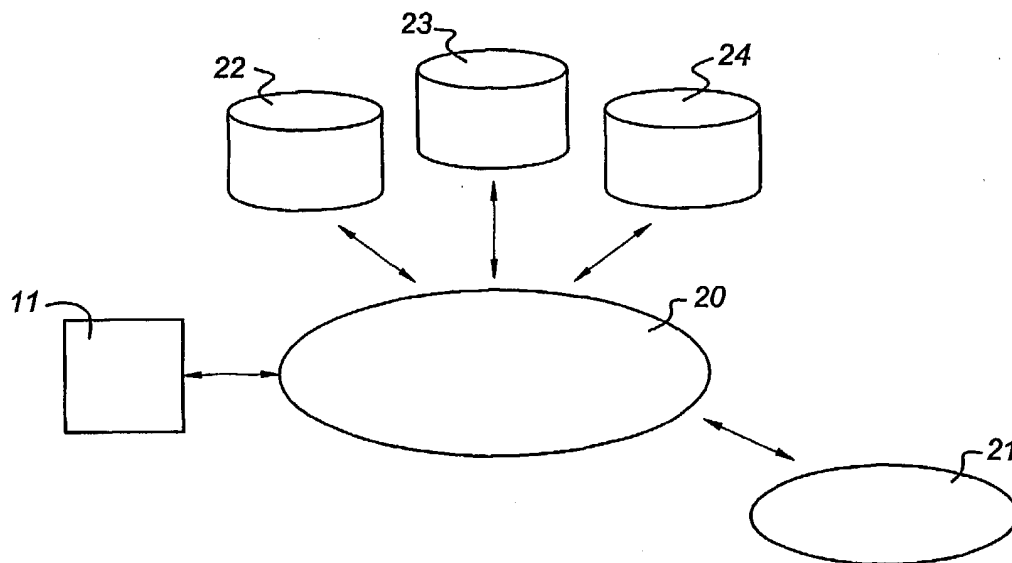
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15. Computer program product, comprising computer executable code, which when run on a computer provides the steps of the method according to one of the claims 1 through 7.

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*Fig 1**Fig 2*

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 00/00842

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04M17/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E Y	WO 01 09853 A (SOFTWARE COM INC) 8 February 2001 (2001-02-08)  page 7, line 1 -page 12, line 6 page 15, line 11 -page 17, line 25 figures 1,4 ---	1-6,8-15  4
X Y A	WO 98 21874 A (ERICSSON TELEFON AB L M) 22 May 1998 (1998-05-22)  page 16, line 24 -page 19, line 4 --- -/--	1-3,15  4-7 8-14

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 00/00842

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Information on patent family members

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